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(54) Process for stabilizing refrigerator oil - refrigerant mixtures.

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(57) The process for stabilizing refrigerator oil - refrigerant mixtures concerns systems containing halogenated hydrocarbons. The purpose of the increased stability is to avoid operating problems such as corrosion damage, deposits and blockages in the refrigerant circulation. This is achieved by adding oil-soluble epoxide compounds to the mixture at a concentration of 0.1 to 5 % relative to the refrigerator oil.

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## Area of application of the invention

The invention concerns the stabilization of refrigerator oil - refrigerant mixtures in refrigerators, especially those operating with chloro-fluoro-hydrocarbons as the refrigerant.

## Characteristics of the known technical solutions (prior art)

Undesirable operating problems such as corrosion damage, deposits and blockages in the refrigerant circulation occur in refrigerators of this kind as a consequence of reactions between the refrigerant and the refrigerator oil, i.e. when the oil has inadequate refrigerant resistance. These phenomena generally lead to the failure of the refrigerator or to a reduction in the performance of the refrigerator.

It is known that the operating characteristics of lubricating oils can be improved by the addition of additives. The addition of additives to refrigerator oils is generally avoided by the industry [H. Reimer, Air-conditioning and Refrigeration Engineering, **3** No. 12, page 401 (1975)]. This is based on the argument that every material that is added provides a possibility for further chemical reactions in the refrigeration circulation.

The stabilization of refrigerator oils by the addition of antioxidants such as di-isobutyl-p-cresol is of only secondary importance because refrigerators operated with chloro-fluoro-hydrocarbons operate in the absence of air. The addition of phenyl-alpha-naphthylamine, ethylene diamine tetraacetic acid and phenanthroline to the refrigerator oil has also been studied (US-PS 3 791 959; US-PS 3 532 631). However additives of this kind have the disadvantage that they are not very soluble in the refrigerator oil and can cause deposits and blockages at the operating temperatures in the refrigerator.

## Aim of the invention

The aim of the invention is to reduce the decomposition reactions taking place in the refrigerant circulation and to limit problems caused by corrosion and the deposit of solid products by means of additives.

## Description of the essential principle of the invention

The invention is based on the task of discovering additives that enable an adequate refrigerant resistance of refrigerator oils towards chloro-fluoro-hydrocarbons to be achieved.

This task is solved according to the invention by a process for stabilizing refrigerator oil - refrigerant mixtures containing halogenated hydrocarbons by adding oil-soluble epoxide compounds to the mixture at a concentration of 0.1 to 5.0, preferably 0.5 to 1% relative to the refrigerator oil. Compounds whose boiling point under normal pressure lies above 160°C are appropriate for use as the epoxides. Compounds that have a high boiling point and a low melting point are especially suitable.

## Embodiment examples

### Example 1

1 g of epoxytetradecane was added to 100 g of refrigerator oil and the solution stirred thoroughly. 1 ml of this solution was brought into contact with difluorodichloromethane (F 12) at 250°C for 96 hours (Phillips test according to TGL 14637).

Afterwards the reaction vessel was opened and a test of colour and chloride was carried out according to TGL 14637. The colour number changed from 0 to 2; the chloride test was negative.

Without the use of stabilizer, the colour number changed from 0 to 3 and the chloride test was positive.

### Example 2

The operation was carried out as in Example 1 except that 1 g of phenylglycidyl ether was added to the refrigerator oil (100 g). This caused the colour number to change from 0 to 1 and hydrochloric acid was not detectable.

### Example 3

The operation was carried out as in Example 1 except that 1 g of isobutylglycidyl ether to 100 g of oil was used as the stabilizer. This caused the colour number to change from 0 to 2. No attention was paid to the formation of hydrochloric acid.

### Example 4

The operation was carried out as in Example 1 except that 2 g of epoxidized soya oil was added to the refrigerator oil. The colour number changed from 0 to 2; the test for hydrochloric acid was negative.

## Patent Claim

Process for stabilizing refrigerator oil - refrigerant mixtures containing halogenated hydrocarbons characterized in that oil-soluble epoxide compounds are added to the mixture at a concentration of 0.1 to 5.0 %, preferable 0.5 to 1 % relative to the refrigerator oil.